

SECTION 04 22 00
REINFORCED UNIT MASONRY

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Includes furnishing all materials, equipment and services as required in conjunction with or properly incidental to construction of all masonry as described and/or as shown on the Drawings.
- B. Comply with Drawings and General Requirements and Referenced Documents.

1.2 CODES and STANDARDS

- A. Concrete masonry unit manufacturer shall certify that masonry units furnished meet or exceed requirements of this Specification.
- B. The Work in this Section, unless noted on the Drawings, or herein specified shall be governed by the latest edition of the following codes or specifications.
 - 1. ACI 531 "Building Code Requirements for Concrete Masonry Structures".
 - 2. ASTM C-145 "Standard Specification for Solid Load Bearing Concrete Masonry Units".
 - 3. ASTM C-270 "Standard Specification for Mortar for Unit Masonry".

1.3 SUBMITTALS

- A. Submit shop drawings showing dimensions necessary for fabrication and placement of reinforcement and accessories.
- B. Do not make shop drawings using reproductions of Contract Drawings.
- C. Submit in writing any requests for modification to Drawings or Specifications. Submitting shop drawings for review does not constitute "in writing" unless it is brought to the attention of the Architect that specific changes are being suggested.

1.4 STORAGE OF MATERIALS

- A. Deliver materials to job site in undamaged condition.
- B. Store concrete masonry units on raised platforms. Cover and protect units from inclement weather.

- C. Store mortar and grout materials in a manner to prevent intrusion of moisture and contaminants.

1.5 ENVIRONMENTAL CONDITIONS

- A. Masonry construction shall be in compliance with "Recommended Practices and Specifications for Cold Weather Masonry Construction" adopted February 1975 by International Masonry Industry All-Weather Council and as specified herein.
- B. Lay no concrete masonry unit when air temperature is below forty degrees Fahrenheit (40° F) unless materials are protected from weather and laid up in shelter. In such instances, maintain materials and surrounding air temperature to minimum fifty degrees Fahrenheit (50° F) prior to, during, and forty-eight (48) hours after completion of masonry work.
- C. In temperatures exceeding one hundred degrees Fahrenheit (100° F), do not lay out mortar beds ahead of placing units. Use a very light fog spray, not sufficient to penetrate masonry, on vertical surface of masonry to aid in mortar curing during first twenty-four (24) hours after placing units.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Concrete Block:
 - 1. Hollow load-bearing units:
 - a. ASTM C 90, Grade N general purpose, Type I moisture-controlled.
 - b. Nominal face dimensions: eight inches (8") high x sixteen inches (16") long.
 - c. Provide standard and fire rated units.
 - 2. Provide normal weight aggregate units.
- B. Flashing: Flashing per Architectural drawings and details.
- C. Horizontal Joint Reinforcing:
 - 1. Continuous open-web welded wire trusses, nine (9) ga. side rods and diagonal ties, galvanized finish, welded at sixteen inch (16") intervals to continuous side rods forming truss design with box ties for connecting concrete block wythe with face brick wythe veneer.
 - 2. Prefabricated corner and "tee" intersecting units.

3. Size for multi wythe construction.
4. Acceptable products:
 - a. Dur-O-Wal, Dur-O-Wal Company.
 - b. Blok-Trus, AA Wire Products Company.
 - c. Trus-Mesh, Hohmann and Barnard.
5. Product Standard: The Drawings and Specifications are based on the following products to establish a standard of quality:
 - a. Manufacturer: Dur-O-Wal Company
 - b. Product: "D/A 370 Dur-O-Eye".
- D. Reinforcing Rods: ASTM A 615, Grade 60.
- E. Weeps: PVC plastic tubes or sash cord.
- F. Portland Cement:
 1. ASTM C 150, Type I or Type III, nonstaining.
 2. Use of masonry cement will not be permitted.
- G. Hydrated Lime: ASTM C 207, Type S.
- H. Mortar Aggregates:
 1. ASTM C 144, free of clay or organic matter.
 2. Gradation:

| Sieve Size | Percent Passing |
|------------|-----------------|
| No. 4 | 100 |
| No. 8 | 95 to 100 |
| No. 16 | 60 to 100 |
| No. 30 | 35 to 70 |
| No. 50 | 15 to 35 |
| No. 100 | 2 to 15 |
| No. 200 | 0 to 2 |
- I. Portland Cement Grout Aggregates: ASTM C 33, pea gravel uniformly graded from three-eighths inch (3/8") to one-half inch (1/2").
- J. Water: Clean and free of deleterious amounts of acids, alkalies or organic matter.

K. Cleaning Agents:

1. Combination of surface acting acids and wetting agent for general purpose cleaning of new masonry surfaces.
2. Acceptable product: Sure-Klean No. 600 Detergent, Pro/So/Co., Inc.
3. Acid solutions are not acceptable.

2.2 MIXES

A. Mortar Proportions:

1. Nonload-bearing walls: ASTM C 270, Type N, 750 psi at twenty-eight (28) days, (1:1:6).
2. Load-bearing walls: ASTM C 270, Type S, 1800 psi at twenty-eight (28) days, (1:1/2:4-1/2).

B. Portland Cement Grout: Portland cement, sand, pea gravel and water proportioned to produce 3000 psi at twenty-eight (28) days with nine and one-half inches (9½") slump when placed.

C. Control batching procedure to ensure proper proportions by measuring materials by volume. Measurement by shovel will not be permitted.

D. Mix mortar in accordance with requirements of BIA M 1 and grout in accordance with ASTM C 476.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Inspect foundation to assure surfaces to support masonry are to proper grade and elevation and free from dirt or other deleterious matter.

3.2 PREPARATION

A. Concrete Masonry Units:

1. Lay only dry units, free of paint, oil, efflorescence or foreign matter.
2. Remove laitance, loose aggregate or anything that prevents bonding to foundation.

- B. Reinforcement: Before being placed, remove loose coatings from reinforcement.
- C. Use masonry saws to cut masonry units.

3.3 INSTALLATION

- A. Installation Tolerances:
 - 1. Maximum Variation from Plumb:
 - a. Vertical lines and surfaces of columns and walls:
 - (1) One-fourth inch (1/4") in ten feet (10').
 - (2) Three-eighths inch (3/8") in twenty foot (20') maximum.
 - (3) One-half inch (1/2") in maximum.
 - b. External corners or control joints:
 - (1) One-fourth inch (1/4") in twenty foot (20').
 - (2) One-half inch (1/2") in forty foot (40') maximum.
 - 2. Maximum Variation from Level or Grades for Exposed Lintels, Sill, Parapets or Horizontal Grooves:
 - a. One-fourth inch (1/4") on any bay or twenty foot (20').
 - b. One-half inch (1/2") in forty foot (40').
 - 3. Maximum Variation from Plan Location of Linear Building Line or Related Portions of Columns, Walls and Partitions:
 - a. One-half inch (1/2") in any bay or twenty feet (20').
 - b. Three-fourths inch (3/4") in forty feet (40').
 - 4. Maximum Variation in Cross-Sectional Dimensions of Columns and Thickness of Walls: one-fourth inch less to one-half inch more (-1/4"; +1/2").
- B. Pattern Bond: Running bond with vertical joints located at centerline of masonry units in alternate courses unless noted otherwise on architectural drawings.
- C. General:
 - 1. Set units plumb, true to line and with level courses accurately spaced within allowable tolerances.

2. Do not install cracked, broken or chipped masonry units exceeding ASTM allowables.
3. Adjust masonry unit to final position while mortar is soft and plastic.
4. Where adjustment must be made or if units are displaced after mortar has stiffened, remove units, clean joints and units of mortar and relay with fresh mortar.
5. Do not pound corners and jambs to fit stretcher units after they are set in position.
6. Adjust shelf angles to keep masonry level and at proper elevation.
7. Provide pressure relieving joints by placing continuous one-eighth inch (1/8") foam pad under shelf angle.

D. Mortar Beds:

1. Hollow units:
 - a. Lay with full mortar coverage on horizontal and vertical face shells.
 - b. Provide full mortar coverage on horizontal and vertical face shells and webs where adjacent to cells or cavities to be filled with grout.

E. Horizontal and Vertical Face Joints:

1. Construct uniform joints, three-eighths inch (3/8") nominal thickness.
2. Shove vertical joints tight.
3. Tool concave joints in exposed surfaces when thumb-print hard with round joints slightly larger than width of joint.
4. Flush cut all joints not exposed.
5. Fill horizontal joints between top of non-load bearing masonry partitions and underside of beams or slabs with flexible material.

F. Control Joints:

1. Keep clean of mortar and debris.
2. Install where indicated and at following locations:
 - a. Changes in thickness, height and direction.

- b. Within eight feet (8') of corners or offsets.
 - c. At control or expansion joints in structure.
 - d. At each side of openings greater than twenty-four inches (24") wide.
 - e. Place control joints at foundation walls, shelf angles, setbacks and materials expanding at different ratios.
 - 3. Concrete masonry units:
 - a. Space joints at thirty feet (30') o.c. maximum in uninterrupted walls.
 - b. Provide continuous vertical control joints through bond beams except at lintels above openings.
 - c. Offset control joints to ends of lintels.
- G. Collar Joints:
 - 1. Keep cavity in cavity walls clean.
 - 2. Remove all protruding mortar fins in cavity to be grouted.
- H. Joining of Work:
 - 1. When joining fresh masonry to set or partially set masonry construction, remove loose units and mortar and clean exposed surface of set masonry prior to laying fresh masonry.
 - 2. If necessary to stop off horizontal run of masonry, rack back one-half (1/2) block length in each course.
 - 3. Do not use toothing to join new masonry to set or partially set masonry.
- I. Reinforcing and Ties:
 - 1. Bars:
 - a. Reinforce each jamb of wall openings with one (1) bar vertical.
 - b. Place reinforcing bars in hollow cores vertically where indicated.
 - 2. Horizontal joint reinforcing:
 - a. Fully embed joint truss type reinforcement in each alternate bed joint sixteen inches (16") on center.
 - b. Extend joint reinforcement entire length of bed joint.
 - c. Place reinforcing in course immediately above opening extending at least sixteen inches (16") past each side of opening.
 - d. Lap reinforcement minimum six inches (6") at ends.
 - e. Bend or weld at offsets or special conditions.

J. Bond Beams:

1. Provide CMU bond beams at top of CMU walls and lintels above openings, and at a maximum of 4'-0 on center.
2. Reinforce bond beams with minimum of two (2) bars and grout.
3. Discontinue bond beams at expansion and control joints.

K. Flashing:

1. General:
 - a. Clean surface to receive flashing and remove projections which might puncture or damage flashing material.
 - b. Seal joints with manufacturer's recommended adhesive.
 - c. Seal top of flashing to ensure moisture cannot infiltrate behind flashing.
 - d. Continue flashing around corners. Ensure membrane material is not interrupted in horizontal plane at corners.
2. Wall base, opening sills and heads:
 - a. Place flashing on mortar bed and cover with mortar.
 - b. Start one-half inch (1/2") from outside face of wall and turn up in cavity eight inches (8") minimum.
 - c. Lap joints four inches (4") minimum.
 - d. Place flashing under and behind sills.
 - e. Place flashing over steel lintels.
 - f. Extend flashing beyond opening jamb lines.

L. Weep Holes:

1. Provide weep holes in head joints in first course immediately above flashing by either leaving head joint free and clean of mortar or placing and leaving sash cord or plastic weeps in joint.
2. Twenty-four inches (24") o.c. maximum spacing.
3. Keep weep holes and area above flashing free of mortar waste.

M. Built-In Work:

1. At completion of conventional masonry unit work, fill holes in joints and tool.
2. Cut out and re-point defective joints.

3. Dry brush masonry surface after mortar has set at end of each day's work and after final pointing.

3.4 CLEANING

- A. Clean initially with stiff brushes and water. Remove efflorescence in accordance with manufacturer's recommendations.
- B. When cleaning agent is required, apply cleaning agent to sample wall area of twenty square feet (20sf).
 1. Do not proceed with cleaning until sample area is reviewed.
 2. Scrub with acceptable cleaning agent and immediately rinse with clear water.
 3. Do small sections at a time, working from top to bottom.
 4. Protect sash, metal lintels and other corrosive parts when masonry is cleaned with acid solution.
- B. Leave area and surfaces clean and free of mortar spots, drippings and broken masonry.

3.05 FIELD QUALITY CONTROL

- A. Testing Laboratory services shall be in accordance with Section 014326. Provide all inspections and testing as required by the 2006 International Building Code.
- B. Testing Laboratory shall perform visual inspection prior to placement of size, type and quality of materials.
- C. Testing Laboratory shall observe and report on placement of reinforcement in Concrete Unit Masonry, including size, quantity, vertical location, horizontal spacing, correctness of bends, splices, clearance between bars and forms, firmness of installation, and security of supports and ties, immediately prior to concreting. Testing Laboratory shall observe and report on proper placement consolidation of grout and placement of bond beams.

END OF SECTION

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